

NEWSLETTER

girep

Groupe International de recherche sur l'enseignement de la physique
International research group on physics teaching
Internationaler Arbeitskreis zur Förderung des Physikunterrichts

N. 26 - July 1991

The mailing expenses of this issue of the Newsletter are being met by the Centre for Science and Mathematics Education at the University of Utrecht (The Netherlands). In exchange for the form of sponsorship, the Newsletter includes a report on the activity of the Centre. You will find the report at page 3.

The sponsorship scheme was first proposed in September 1989 by the General Assembly at the GIREP Conference on Energy Alternatives - Risk Education (Lake Balaton). I wrote about it in Newsletter n. 23. Newsletter n. 23 was sponsored by the Institute of Physics in London, which has often supported GIREP in many other ways too. The sponsorship amounts to sending 100 £st (approximate cost of one issue of the Newsletter) to the GIREP Treasurer and a two page article on your institution to the Secretary. The article should arrive in time for publication in the Newsletter to be sponsored (preferably in June or December).

In this issue of the Newsletter you will also find the GIREP annual balance and an anticipation of the agenda of the next General Assembly, to be held in Torun this summer. In the last part of the Newsletter you will find the usual information about publications and Conferences and the updated list of members.

The envelope label shows the date of your last payment according to the Secretary's data. If the information is wrong send me a short note, but please do update your fee if you are late. Thank you!

1. GIREP BALANCE, JUNE 1990 - JUNE 1991

by Brian Davies, Treasurer of GIREP

Notes: 1) GIREP has four main Bank Accounts: (a) Barclays Bank and (b) Girobank, London, (c) Banca Popolare, Modena, (d) - a small and decreasing account - Crédit Suisse, Lausanne.

2) There are also very small GIREP funds held in Hungary and, because of this year's venue for the GIREP Conference, in Poland. The necessary adjustments and balances in accounts will be made in relation to the Hungarian and Polish accounts, and in the light of currently effective exchange rates, at or after the Torun Conference, and will show up in the 1992 accounts.

3) The Accounts relate to the latest banking information to hand: that is, until the end of May, 1991, for Crédit Suisse, Girobank and Barclays and to the end of March 1991 for Banca Popolare.

4) Supplementary information will be added as "Notes" to the main accounts, to inform members of changes in those accounts

initiated by or notified to the Treasurer since the dates mentioned in note 3, above.

5) Original documentation is held at the Institute of Physics, London. Photocopies of any documents will be sent on request, free of charge but not postage free, to any GIREP member.

	CREDIT	DEBIT
<u>(a) Crédit Suisse (SFr)</u>		
from 27.06.90 until 16.06.91		
1) Carried forward from previous balance	19.05	
2) Bank Charges		10.00
3) Fees	90.00	
	-----	-----
Totals	109.05	10.00
Carried forward		<u>99.05</u>

Note: Members will know that we have been trying to phase out this account and I know of no other transactions on it. By the time of the Torun Conference we shall have to pay some Bank charges, approximately 10 SFr.

<u>(b) Barclays London (£st)</u>		
from 27.06.1990 until 23.05.1991		
1) Carried forward from previous balance	451.11	
2) Fees	454.95	
3) Bank Charges		9.91
4) Transfer from Girobank	450.00	
	-----	-----
Totals	1356.06	9.91
Carried forward		<u>1346.15</u>

<u>(c) Girobank (£st)</u>		
from 9.07.1990 until 9.05.1991		
1) Carried forward from previous balance	224.08	
2) Fees	275.00	
3) Transfer to Barclays		450.00
4) Account n.538894814	10.70	
	-----	-----
Totals	509.78	450.00
Carried forward		<u>59.78</u>

Note: The transfer to Barclays was effected in order to build up a larger account prior to dollar transfer to Poland for the '91 Conference.

<u>(d) Banca Popolare (Lit)</u>		
from 28.02.1990 until 31.03.1991		
1) Carried forward from previous balance	525185	
2) Fees	326000	
3) Bank Charges		87000
4) Interests	24456	
5) Secretary's expenses (NL)		330050
6) Secretary's expenses (stationary)		184000
	-----	-----
Totals	875641	601050
Carried forward		<u>274591</u>

Note: The Banca Popolare account is kindly dealt with by Dr. Marisa Michelini. My own presentation is therefore in the nature of a sub-audit. I confirm and agree these figures, which are the latest available.

Dollar summary at current rates of exchange

In London (both accounts) £st 1405.93	US\$ 2263.55
In Italy Lit. 274591	200.95
In Switzerland SFr 99.05	62.29

Total in US\$	2526.79

2. GENERAL ASSEMBLY OF GIREP (Torun, August 1991)

The General Assembly of GIREP members will be held during the GIREP Conference "Teaching about Reference Frames: from Copernicus to Einstein" (Torun, Poland, 19-24 August). The provisional Agenda is as follows. The final Agenda will be communicated to the membership at the beginning of the Conference.

- 1) Our President Paul Black is resigning and a supplementary election will be called to fill the vacancy. Please note that if one of the present Vice-Presidents (or other officers) will be elected as President, the Assembly will be requested to elect another Vice-President. Nominations for the post (or posts) are welcome. It should be clear that the present Committee as a whole is not expiring, its mandate being valid until 1993.
- 2) Future GIREP Conferences: an update on the 1993 Conference and proposals for the Conference of 1995.
- 3) Reports on the activities of other organizations (ICPE, UNESCO, etc.).

3. PROCEEDINGS OF THE TORUN CONFERENCE

The Proceedings of the Conference in Torun will probably be available early next Spring and will be mailed to all GIREP members who have updated their fee until 1991.

4. RESEARCH ON PHYSICS EDUCATION AT UTRECHT UNIVERSITY

by P. L. Lijnse and H. P. Hooymayers, June 1991

Dear GIREP members,

In 1989 at Utrecht University, a new Centre for Science and Mathematics Education has been founded, in which the work of four groups on physics, chemistry, biology and mathematics education is coordinated. These groups are working on pre- and in-service teacher training, curriculum development and educational research for these subjects, ranging from primary till tertiary education. It's our pleasure now to introduce to you in more detail the work on physics education that is done in this Centre.

The physics education group in its present form, originates from the early seventies. Due to the "curriculum wave" of those times (PSSC, Nuffield, IPN, ASEP, etc) also a Dutch large scale curriculum development project was set up, that fortunately happened to be based at Utrecht. This project has become known, also internationally, under the acronym PLON. It has been in operation from 1973 till 1986. A main focus of this project was to develop a (balanced) physics curriculum for pupils in the age range from 14-18, that would enable teachers to update the image

of physics, to teach it "in personal and social contexts", and to foster a broadening of aims related to an open learning climate.

Especially in the eighties the PLON curriculum has got recognition as a good worked out example of what has become known as STS-curricula, although we think that to be a too narrow characterisation. In the meanwhile the attention of the science education society had been drawn to the influence of "alternative frameworks". From evaluation results of curriculum projects and from further research in science classrooms it became clear that in science teaching our knowledge of the teaching/learning process is still very inadequate. Since then, by many, a plea is made for constructivist teaching approaches, though it is still unclear what these should look like at a concrete level. Therefore we think that both the constructivist emphasis on (mainly) cognitive learning and STS emphasis on relevance and interest should join forces.

As a consequence, curriculum development, be it large or small scale, should be accompanied and preferably preceded by in depth studies on teaching and learning. As a follow-up to the PLON-project two main activities have been started. A curriculum development and research project on the introduction of environmental education in our school system, and a developmental research programme on teaching/learning theories for particular topics of physics.

Research is done now on pupils' and teachers' conceptual development in the following areas:

- a) for the higher grades, with higher ability pupils:
 - energy: the development of the conceptual network of energy from a practice-oriented towards a discipline-oriented structure;
 - mechanics: developing concepts within contexts of Traffic and Safety (including the possibilities of microcomputers and dynamic modelling);
 - radioactivity: teaching about this topic from the point of view of risk evaluation;
 - modern particle ideas (including quarks): can they be introduced and to what level of understanding.
- b) for lower grade pupils, including pupils of lower ability:
 - the introduction of a common core curriculum for physics/chemistry;
 - the introduction of particle ideas and radioactivity;
 - the development of the interest of girls for physics, in relation to what and how it is taught and understood.

In this long term research programme we aim at the development of empirically supported "educational structures for physics teaching at the secondary level and for physics teacher education. This is done "bottom-up" in a cyclical process of development of instruction and research of teaching/learning processes. It is based on our grown conviction that disciplinary structures of physics are not suitable to structure education, as is usually done in "logical" top-down elementarisations. Such "translations" lead inevitably to communication problems in the classroom and eventually to "misconceptions" as results of instruction. Of course, our programme is related to the activities of many others.

Our work tries to build on the following starting points:

- a) constructivism: knowledge development is the result of active constructions of learners themselves, based on the actual

- mental structure they bring to the classroom;
- b) much of physics teaching should be closely related to real life situations;
 - c) teaching should start where pupils are, and develop gradually towards the concepts of physics;
 - d) teaching and learning should be interactive, with possibilities for pupils to make, follow and discuss their own constructions;
 - e) long term outlining of conceptual development needs a levellike structure, roughly describable as lifeworld, phenomenological, descriptive and theoretical. This asks for a thorough reflection on and description of what reasoning at those levels may mean;
 - f) learning processes take often place in discontinuous jumps. Research is needed to know them and how they are taken. In general, reflection on possible cognitive conflicts, use of models and metaphores, bridging analogies, experiments, etc., may be useful guidelines, but the precise "how and what" has to be found out in actual teaching/learning situations;
 - g) decisions on the aims of teaching and the contents of the syllabus cannot be decided on beforehand, but should be based on results of the type of research described above.

The above presents a brief description of our main views on research and development in physics education. Of course, a lot of other activities are going on as well in our group, concerning in- and pre-service teacher training, providing help for practising physics teachers, etc. We would appreciate to exchange views and establish regular working contacts with more people, particularly from Europe. More cooperation across borders at the working level is necessary to make progress in our field of work. So, please feel free to ask for more information or pay us a visit.

P. L. Lijnse and H. P. Hooymayers, Centre for Science and Mathematics Education, P.O. Box 80.008, 3508 TA Utrecht, The Netherlands, (tel. 030-531179; fax n. 030-517629)

5. WORKSHOP ON TRANSFORMING PHYSICS CONTENT USING NEW TECHNOLOGIES

Douglas A. Davis, of the Physics Department of Eastern Illinois University, Charleston, IL 61920, USA, sent enthusiastic information on a leadership development Workshop on Transforming Physics Content Using New Technologies he attended. The Workshop, directed by Dr. R. G. Fuller, was held at Colorado Springs in July 1990, lasted twelve days and will be repeated this summer. Unfortunately the information arrived after Newsletter n. 25 was mailed: too late for allowing interested GIREP members to enquire about the possibility to attend.

Here is an outline of the Workshop from the leaflet Prof. Davis sent us. The participants explored four different features of interactive technology (interactive video, symbolic algebra software, HyperCard lessons, computer enhanced classrooms) that can be used to change physics lessons. Working cooperatively in small groups, they prepared interactive materials for introductory, university level, general physics. The topics of

these materials, ranging from mechanics through modern physics, were especially chosen to highlight the capabilities of the new technologies to transform the physics content. Each participant was expected to prepare at least two different physics activities to use at their home institutions and share with the other participants. For this purpose, in the two weeks they worked with different physics concepts and different technologies, in a different team.

Each participant was expected to organize and lead at least one local/regional workshop on the transformation of content using interactive technologies for other college professors and educators in the following months.

If you are interested in receiving more information and/or materials about this workshop, you may write to: R.G. Fuller, Room 110, Ferguson Hall, c/o Physics Dept., University of Nebraska-Lincoln, NE 68588-0111, USA.

6. PUBLICATIONS

1) Some thirty copies of the Proceedings of the ICPE Conference on Education for Physics Teaching (Trieste 1980) are available c/o the GIREP Secretary in Ivrea (Italy). These Proceedings were sitting in Modena, from where old GIREP members may remember having received them as a bonus in 1983. The Secretary is willing to mail them on the asking, on a "first coming, first served" basis, provided the postage (approx. Lst 1.50) is paid by the receiver: for example by adding it to the GIREP fee.

2) M T Bruck, Exercises in Practical Astronomy using Photographs with Solutions, Adam Hilger, IOP Publishing, Techno House, Redcliffe Way, Bristol BS1 6NX, U.K. (124 pages, £st. 18.50)

This collection of high-quality photographs and exercises in practical astronomy, based on the Edinburgh University Teaching Packages but enriched with many new photographs and exercises, is intended for first year and intermediate level University students. The package is composed of authentic material as is currently used for advanced research.

The photographs can be studied with equipment as simple as rulers and protractors and provide meaningful practical work for courses in elementary astronomy and astrophysics. The set of exercises covers 12 topics and is normally sufficient for a one year course of the standard type offered in the UK, in USA and elsewhere. Ample hints and worked solutions are designed to enable students to work independently. S.I. units are used for physical data and in conversions of astronomical quantities.

7. FORTHCOMING CONFERENCES

1) Sixth International Symposium of IOSTE 12-22 August 1991, Palm Spring, California (USA)

Theme: Science and Technology Education: Responsible Change for the 21st century.

Contact: Dr. Herbert K. Brunkhorst, Institute for Science Education, California State University, 5500 University Parkway, San Bernardino, CA 924407-2397

- 2) International Conference of Physics Students 26-31 August 1991, Vienna (Austria)
Contact: ICPS c/o Fachbereich Physik, Technische Univ., Wiedner Hauptstrasse 8-10, Wien A-1040.
- 3) EPS Conference on Scientific Education and History of Physics 28-31 August 1991, Cambridge (UK)
Contact: Ms. Ch. Blondel, Cité des Sciences et de l'Industrie, Centre de Recherche en Histoire des Sciences et des Techniques, 75930 Paris cedex 19 (France)
- 4) Cinquièmes Journées Nationales Informatique et Pédagogie des Sciences Physiques 26-28 March 1992, Marseille (France)
Organised by: Union des Physiciens, Institut National de Recherche Pédagogique, Inspection Générale de l'Education Nationale, Université de Provence.
This Meeting is a very good observation point for getting acquainted with the current trends of using computers in physics and chemistry education in France, mostly at secondary and early university levels. The working language is french.
Contact: F.M. Blondel, INRP, 91 av G. Péri, 92120 Montrouge, France.
- 4) Concepts and Trends in Technology Education 22-29 April 1992, Erfurt (Germany)
Organized by: ICASE, INISTE, UNESCO
This Symposium will be the first pan-European meeting on technological education to be held in a unified Germany. Its principal aim is to discuss technological literacy and competence in technology education within a European dimension. The working language will be english.
Contact: Prof. D. Blandow, University College of Education, Erfurt, Germany
- 5) Teaching Modern Physics-Statistical Physics 19-29 July 1992, Bajadoz (Spain) (ICPE-TMP)
The Conference will discuss the teaching of topics like Statistical Physics and Thermodynamics at levels from secondary school to University. The activities will be plenary lectures and extensive parallel working groups. The first circular was circulated in April 1991.
Contact: Prof. F. Cuadros, General Secretary, TMP-STATPHYS BAJADOZ'92, Dpto. de Fisica, Universidad de Extremadura, 06071 Bajadoz, (Spain), fax n. ++34-24-236304
- 6) Teacher Training in Physics September 1992, Dortmund, Germany (ICPE)
Contact: D. K. Nachtigall, Phys. Inst., Univ. Dortmund, Otto Hahn Str., Dortmund D-4600
- 7) Conference on Physics Education 8-11 Sept. 1992, Tokai Univ. Kanagawa, Japan (ASPEN, UNESCO)
Contact: Ryuzo Abe, College of Arts and Science, Tokio Univ., 3-8-1 Komaba, Meguru-ku, Tokio 153
- 8) Physics teaching: global and community issues 7-11 December 1992, Manila, Philippines (ICPE, ASPEN)
Contact: Vivien Talysayon, ISMED, Univ. of Philippines, Quezon City.
- 9) GIREP '93 Conference on Teaching Optics and Communications Summer 1993, University of Minho, Braga, Portugal
Contact: Brian Davies, The Institute of Physics, 47 Belgrave Sq., London SW1X 8QX, U.K.

8. GIREP MEMBERS UPDATED

The following list includes members who updated their fee until 1990 or later. Only the 1991 members have the right to vote at the General Assembly this year.

Please note that the Treasurer lacks exact information about people who update their fees in Hungary or Poland. These people may fail to find themselves listed.

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From the point of view of nationality, the membership seems to be so distributed:

Austria 1, Belgium 3, Brazil 1, Canada 1, China 1, Cyprus 1, Czechoslovakia 1, Denmark 9, Finland 3, France 4, Germany 6, Greece 1, Honduras 1, India 2, Israel 11, Italy 31, Kenya 1, Kuwait 1, Mexico 1, Netherlands 3, Norway 3, Poland 2, Portugal 5, South Africa 2, Spain 7, Sweden 2, Switzerland 1, U.K. 10, U.S.A. 9, Yugoslavia 3, Zambia 1.

According to these figures, the actual membership should be of the order of 120 but, as already mentioned, the real number of Hungarian and Polish members is uncertain.

GENERAL INFORMATION

GIREP COMMITTEE

President Paul Black, Cornwall House Annex, Waterloo Rd., London SE18TX, UK (tel 071/8365454, fax 071/8723182)

Vice-presidents George Marx, Dept Atomic Physics, R. Eotvos Univ, Puskin u.5, PB 327, 1088 Budapest, Hungary (telex 225459, tel 361/131843)

Joseph Depireux, Institut de Physique, 4000 Sart-Tilman (Liege 1), Belgium (tel 3241/563612, fax 3241/562355)

Secretary Silvia Pugliese Jona, via San Nazario 22, 10015, Ivrea (Torino), Italy (tel 0125/49869, fax 0125/631872)

Treasurer Brian Davies, The Institute of Physics, 47 Belgrave Sq, London SW1X 8QX, UK (tel 01/2356111, fax 01/2596002)

FEES

The accounting year runs from January 1 to January 1. Fees paid after September in any year will be credited on the following year, unless the applicant specifies otherwise.

The current fee (1991) is 10 £st, preferably paid into one of the two London accounts or, if that is not possible, the equivalent of 10 £st in the currencies and into the accounts indicated below. The rate of exchange will be that existing on the day of application for (or renewal of) membership, with members paying their own bank charges and mailing costs. It is possible and, indeed, advisable in order to reduce bank expenses, to pay several years together in advance.

In cases of real difficulty of payment please contact the Secretary who will be able to advise whether special arrangements can be made.

London accounts (a) GIRO: Fees in £st should be made out to "Brian Davies re GIREP" GIRO Account n° 53 889 4806. This number must be quoted and the money sent to GIROBANK, c/o The Post Office, Eccleston Street B0 LONDON SW11 9LS, UK. At the same time, please send a note to the Treasurer confirming how much money you sent and when and for what years.

(b) Non GIRO: made out to "GIREP ACCOUNT N° 90301248" and sent to the Treasurer.

Italian Account Equivalent of £st 10 can be paid, in Italian lire only, made out to "Marisa Michelini" and sent to: Dr Marisa Michelini, Istituto di Fisica dell'Università, via Campi 213/A, 41100 Modena, Italy.

Swiss Account For historical reasons it is still possible to pay fees in SFr to the equivalent of 10 £st, into "GIREP Account n°376089-91", Credit Suisse, 1002 Lausanne, Switzerland. This is not a good method but if you must choose it, please send the Treasurer a letter with every possible detail of your banking transaction with Credit Suisse. Failure to do so may, regretfully and through no fault of GIREP, mean that your payment will never appear in our databases.

Fees from countries where the above procedures are very difficult or impossible may be paid directly to George Marx after having agreed on a procedure with him.

APPLICATIONS AND NEW MEMBERS

Applicants for membership should please require the Application Form from the Treasurer.

INQUIRIES - CHANGES OF ADDRESS

Please address inquiries concerning fees to the Treasurer.

Other inquiries may be addressed to the Secretary or to any other member of the Committee.

Please send notice of changes of address to the Secretary.

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